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# ON THE BREEDING HABITS OF BUTLER'S GARTER-SNAKE.

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Relatively few observations have been made on the breeding habits of snakes, at least few have been published, and there has appeared in print considerable misinformation on the subject, due principally to wrong identification of species. There is especially a deplorable lack of careful studies of the life-histories of the different forms.<sup>1</sup> Concerning the North American forms, we know that some are ovo-viviparous and others oviparous, that copulation probably takes place ordinarily in the spring, although in one species it has been said to occur also in the fall,<sup>2</sup> that the young appear in the late summer, and there is some evidence that there is a gregarious tendency in the breeding season that may lead to the formation of "piles" of snakes.<sup>3</sup> But of the exact time of copulation, the courtship reactions, the significance and commonness of the "snake piles," the length of the gestation period in the different forms, and kindred subjects only the most meager data have been gathered.

During the present year the writer has been able to get a pair of Butler's garter-snake (*Thamnophis butleri* Cope) to breed in captivity and has carried the female over the period of gestation. On April 9, which was about the first day in spring when the snakes were at all active in this region, a male and female of this species were found together near Ann Arbor. These failed to copulate in captivity, although the male courted the female assiduously for several days. On April 10, seven specimens were collected, and a lot consisting of five males and a large female

<sup>1</sup> An excellent summary of the data on the breeding habits of certain North American snakes is given by O. R. Hay, *Proc. U. S. Nat. Mus.*, XV., pp. 385-398.

<sup>2</sup> Coues and Yarrow, *Bull. Geol. and Geog. Surv. Terr.*, IV., 278.

<sup>3</sup> For a résumé of the literature on this subject see Ruthven, A. G., *Bull. U. S. Nat. Mus.*, 61, pp. 13-14.

placed together in a cage. The female was courted by the males for five days before she appeared to be ready for copulation.

The method of courtship is exactly as described<sup>1</sup> for *T. sirtalis*. The male or males lie on or closely along side of the female, keep up at intervals a spasmodic movement of the abdomen, and endeavor to maintain a loop of the tail over that of the female and to insert the posterior part of the body, ventral side up, under hers.

Early on the morning of April 15 five males were at the same time endeavoring to copulate with the female, showing at once that the sexual impulse was at its height and confirming the conclusion that the so-called snake piles are due to this impulse. The exact moment of copulation was not observed but it was within a few minutes of 12 noon. When one of the males had succeeded in inserting one of its hemipeni—the right—in the cloaca of the female the other males at once crawled away.

The pair remained *in coitu* for two hours and fifteen minutes. During that time the male endeavored to maintain a position along the back or close to the side of the female and when in this position kept up the abdominal movements, but the female moved rather constantly about, dragging the male often at full length behind her. Occasionally she rolled rapidly over and over as many as ten times, turning the body of the male at the same time,<sup>2</sup> but this did not break the connection, confirming Cope's<sup>3</sup> statement that the hemipenis cannot be withdrawn except by invagination.

When the act of copulation was completed the male was removed and the female carefully cared for. She ate freely, was fed as much as she would eat, and was little disturbed. Under this treatment she remained in the best of health and on September 6, about 10 A.M., gave birth to thirteen young. This makes the period of gestation almost exactly 144 days.

It should be remarked that either the length of the period of gestation varies, or the breeding season is of some length and depends upon whether the spring is early or late, for the writer

<sup>1</sup> Ruthven, A. G., *loc. cit.*, p. 178.

<sup>2</sup> More or less of this restlessness of the female may have been due to her being in captivity.

<sup>3</sup>Cope, E. D., Rept. U. S. Nat. Mus., 1898 (1900), p. 701.

has recorded the birth of a brood as early as August 7,<sup>1</sup> and on August 25, 1912, a young specimen collected at Ann Arbor and at the most but a few days old was received by the museum. It is very probable that the length of the gestation period is rather exact for the species, that the snakes breed approximately as soon as the weather is warm enough to permit them to become active, and that the breeding season is about a month long. In southern Michigan the snakes rarely appear as early as the second week in March and usually before the first week in April, so that in this region the general breeding season probably extends from the latter part of March over most of April.

<sup>1</sup> Ruthven, A. G., *loc. cit.*, pp. 90-91.